CLAIMS

1. A method for treating fumes generated during the production, conversion and/or handling of heated products of petroleum origin, such as hydrocarbons, asphalts and bituminous hot mixes, characterized in that it implies:
- the introduction of said fumes into a reactor in which the fume components undergo free radical degradation by cold plasma generated in the reactor by the introduction of air through at least one dielectric barrier discharge arranged close to at least one of the reactor walls which extend parallel to the flow direction of the fumes passing through the reactor, and
- the retention of the reaction products generated in the reactor from the free radical entities resulting from the degradation of the fume components, using at least one appropriate trapping device.

2. The method as claimed in claim 1, characterized in that the fumes are introduced by a carrier air stream.

3. The method as claimed in either of claims 1 and 2, characterized in that at least one dielectric barrier discharge is present close to each side wall of the reactor.

4. The method as claimed in any one of claims 1 to 3, characterized in that the trapping device comprises at least one fluidized bed of an advantageously mineral medium.

5. The method as claimed in claim 4, characterized in that said medium is a granular material advantageously containing alumina, silica, or calcite.

6. The method as claimed in either of claims 4 and 5, characterized in that said medium is a microporous granular material such as zeolite or pumice.

7. The method as claimed in any one of claims 4 to 6, characterized in that said medium is a basic granular material such as pozzolan or a carbonate type rock.

8. The method as claimed in any one of claims 4 to 7, characterized in that the size of said medium is between 0.5 mm and 20 mm, advantageously between 1 mm and 10 mm.

9. The method as claimed in any one of claims 4 to 8, characterized in that the fluidized bed is fixed or circulating.

10. The method as claimed in any one of the preceding claims, characterized in that another dielectric barrier discharge is located close to the reactor outlet, advantageously placed perpendicular to the flow direction of the fumes passing through the reactor.

11. The method as claimed in any one of the preceding claims, characterized in that it further comprises, at the reactor outlet, a step of degradation of the residual ozone formed in the reactor by the passage of the air through the dielectric barrier discharge(s).

12. The method as claimed in any one of the preceding claims, characterized in that it further comprises an at least partial recirculation of the purified gases located in the gas stream leaving the reactor to the reactor inlet, in a mixture with the fumes to be treated.

13. A device for treating fumes generated during the production, conversion and/or handling of heated products of petroleum origin, such as hydrocarbons, asphalts and bituminous hot mixes, in a reactor (1) comprising:

- at least one fume introduction system (2) in the lower part of the reactor (1),
- at least one dielectric discharge member (3) replacing at least part of at least one of the reactor walls (1) which extend parallel to the flow direction of the fumes passing through the reactor,
- at least one system for introducing air (4) through said dielectric discharge member(s),
- at least one appropriate trapping device (5) for retaining the reaction products generated in the reactor, and
- at least one discharge stack (6).

14. The device as claimed in claim 13, characterized in that the fume introduction system (2) contains a Venturi (2').

15. The device as claimed in either of claims 13 and 14, characterized in that the dielectric discharge member(s) (3) is (are) made in the form of modulable cassettes each consisting of a plurality of parallel electric tubes (7), said electric tubes each consisting of electric wires (8) sheathed in a dielectric insulation (9) and supplied by a high voltage generator.

16. The device as claimed in any one of claims 13 to 15, characterized in that the electric wires (8) are of copper.

17. The device as claimed in any one of claims 13 to 16, characterized in that the dielectric insulation (9) is of quartz, ceramic or glass.

18. The device as claimed in any one of claims 13 to 17, characterized in that the diameter of the dielectric insulation sheath (9) is between 2 and 10 mm.

19. The device as claimed in any one of claims 13 to 18, characterized in that the space between the parallel electric tubes (7) is between 1 and 2 mm.

20. The device as claimed in any one of claims 13 to 19, characterized in that at least one dielectric discharge member (3) is present to replace at least part of each side wall of the reactor (1), said members (3) being advantageously arranged in a face-to-face layout.

21. The device as claimed in any one of claims 13 to 20, characterized in that the trapping device (5) comprises at least one fluidized bed of an advantageously mineral medium.

22. The device as claimed in any one of claims 13 to 21, characterized in that it further comprises at least one filter means (10, 11) in the upper part of the reactor (1) before the discharge stack (6).

23. The device as claimed in any one of claims 13 to 22, characterized in that it further comprises at least one dielectric discharge member (3), in the upper part of the reactor (1), before the discharge stack (6).

24. Use of the method as claimed in any one of claims 4 to 9 or of the device as claimed in claim 21,

in which the trapping device (5) comprises at least one fluidized bed of granular materials, in the preparation of an aggregate used in the production of a roadbuilding material.

25. Use as claimed in claim 24, characterized in that the roadbuilding product is a hot mix or a bituminous mix.